

On some new and remarkable species of Aphodiinae from Japan and Formosa

SIZUMU NOMURA¹⁾ and TAKEHIKO NAKANE²⁾

Aphodius (Acrossus) unifasciatus, sp. nov.

Oblong-oval, moderately convex, rather shining. Black, each elytron light testaceous, with a black undulate fascia just behind the middle and the sutural and lateral margins more or less piceous, the fascia placed in the 2nd to 8th interval and their crests are in the 3rd, 5th and 7th.

Head strongly and closely and in front somewhat rugosely punctured, the frontal suture fine but clearly defined, without tubercles, and the punctures behind the suture somewhat finer, the clypeus broad, narrowly ridged and broadly truncate in front, obliquely converging forwards at the sides, the cheeks rather prominent, slightly rounded and obtusely angulate. Pronotum transverse, slightly rounded and rather narrowly margined at the sides, the base not margined, the disk somewhat closely and distinctly, on the sides closely and coarsely and along the base rather closely, punctured. Scutellum triangular, with a few punctures near the base. Each elytron bears a sharp humeral tooth, and rather finely but clearly striate, with distinct punctures in the striae, the intervals slightly convex, finely and sparsely punctured, very minutely chagreened, and very shortly pubescent on the sides and near the apex. Mesosternum closely and strongly punctured and partly chagreened on both sides. Metasternum rather sparsely punctured, with a shallow longitudinal impression in the middle and pubescent on the sides. Metatarsus slightly, longer than the upper terminal spur on the hind tibia and a little longer than the

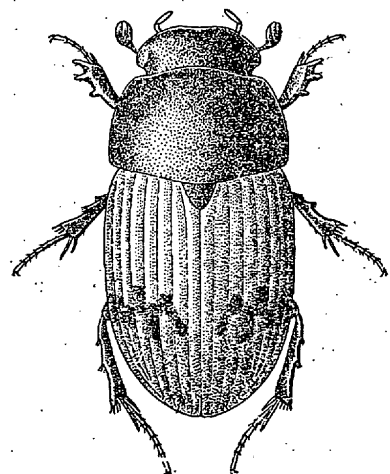


Fig. 1 *Aphodius (Acrossus) unifasciatus*, sp. nov.

¹⁾ Toho High School, Kunitachi, Tokyo.

²⁾ Entomological Laboratory, Saikyo University, Kyoto.

3 following joints combined.

Body length: 5.5–6 mm.

Habitat: Japan (Honshu).

Holotype (1 ♂) & 1 *paratype* (1 ♀): Buhei-toge, Ise, Honshu: 1. June 1947 (S. Osawa leg.). *Allotype* (1 ♀) & 2 *paratypes* (2 ♂♂): Kibune, Yamashiro, Honshu: 24.–25. April 1943 (M. Goto leg.). Types in our collection.

This species somewhat resembles *A. (Acrossus) atratus* Waterhouse, but the elytra are light-testaceous with black fasciae.

Aphodius (Acrossus) superatratus, sp. nov.

Oblong-oval, gently convex, black, shining.

Head finely but distinctly and moderately closely punctured, and the punctuation somewhat closer in front and a little finer and sparser behind the frontal suture, which is very fine and only perceptible, the clypeus broad and nearly semicircular, very feebly emarginate and rather narrowly ridged in front, the cheeks rather prominent, slightly rounded and obtusely angulate. Pronotum transverse, finely and not so closely punctured, with large and strong punctures set sparingly and quite unevenly on the disk, somewhat closely near the base and thickly on the sides, the sides rather broadly margined and slightly rounded, the hind angles rounded, and the base not margined. Scutellum triangular, with a few distinct punctures near the base. Elytra bear a small tooth on each shoulder, very minutely pubescent on the sides and near the apex, and finely striate, with fine but distinct punctures in the striae, the intervals very slightly convex, finely punctured. Mesosternum closely and strongly punctured, partly chagreened on both sides, with a fine longitudinal groove in the middle. Metasternum smooth, sparsely and rather finely punctured, with a slight longitudinal line in the middle, and near the side margins the punctuation strong and somewhat spiculate. Metatarsus nearly as long as the upper terminal spur of the hind tibia and a little shorter than the 4 following joints together.

Body length: 6.5–8.5 mm.

Habitat: Japan (Honshu).

Holotype (1 ♂), *allotype* (1 ♀) & *paratypes* (1 ♂, 4 ♀♀): Buhei-toge, Ise, Honshu: 1. June 1947 (S. Osawa leg.). Types in our collection.

This species also resembles *A. (Acrossus) atratus* Waterhouse, but each shoulder bears a small tooth, and the striae and punctures on the elytra are much finer.

Aphodius (Acrossus) formosanus, sp. nov.

Black, shining, the elytra very slightly dilated backwards and very minutely pubescent towards the apex.

Head finely and in front somewhat strongly punctured, the clypeus semicircular, slightly truncate and somewhat thickly ridged in front, the cheeks a little rounded, the frontal suture very slight. Pronotum somewhat finely, on the sides closely and

in the middle sparsely punctured, and on the sides and along the base with a few somewhat larger punctures, the side margins strongly, somewhat broadly and feebly rounded, the hind angles broadly rounded and the base slightly emarginate on both sides. Scutellum triangular and finely punctured on the base. Elytra very finely and feebly striate, the punctures which are a little stronger in the striae and notch slightly the sides of the intervals, the latter finely punctured and flattened. Mesosternum a little closely and strongly punctured, and chagreened on the sides, without a longitudinal groove in the middle. Metasternum smooth, very sparsely and finely punctured, in the middle with a very shallow longitudinal furrow. Metatarsus as long as the upper terminal spur of the hind tibia and distinctly shorter than the 4 following joints combined.

Body length: 6.5 mm.

Habitat: Formosa.

Locality: 1 ♂. Mt. Hassenzan (2300 m.), Central Formosa : 9. July 1941 (T. Sato leg.).

This species is very closely allied to the preceding and *A. (Acrossus) haliki* Balthasar.

Aphodius (Acrossus) japonicus, sp. nov.

Oblong, the elytra a little dilated backwards, gently convex and without pubescence above, black and shining.

Head very finely and not closely punctured, the clypeus semicircular, slightly truncate and somewhat thickly ridged in front, the cheeks rather prominent, a little rounded and obtusely angulate, and the frontal suture very slight. Pronotum transverse, bears very fine punctures (in the female the punctures are a little stronger), and in addition a number of large punctures are scattered among them on the sides and along the base, without or with a very shallow longitudinal groove in the middle, the side margins strongly, somewhat broadly margined and slightly rounded, the hind angles broadly rounded and the base slightly emarginate on both sides. Scutellum triangular and very finely punctured near the base. Elytra very finely and feebly striate, with punctures somewhat stronger in the striae, the intervals very slightly convex, very finely and sparsely punctured. Mesosternum very closely and strongly punctured, partly chagreened on both sides, and with or without a short longitudinal groove in the middle. Metasternum smooth with a shallow longitudinal groove in the middle, and pubescent on both sides. Femora finely punctured. Metatarsus nearly as long as the upper terminal spur of the hind tibia and somewhat shorter than the 4 following joints combined.

Body length: 6.5–10 mm.

Habitat: Japan (Honshu).

Holotype (1 ♂), *allotype* (1 ♀) & *paratypes* (1 ♂, 4 ♀ ♀): Kamikochi, Shinano, Honshu : 21.–28. July 1947 (S. Osawa leg.). Types in our collection.

This species is somewhat allied to the preceding one but lacks humeral tooth on the elytra.

For the sake of convenience we will give here an abbreviated key to the subgenus *Acrossus* as follows:

1. Sutural intervals of elytra not very narrowed near the apex, where it is as half in breadth as it is at the base. 3, 4.
2. Sutural intervals distinctly narrowed near the apex, where it is at most as one third in breadth as it is at the base. *luridus*, etc.
3. Elytral intervals flattened near the apex; large species (10 ~ 11 mm.).
..... *ritsemai* & *klickai*.
4. Elytral intervals more or less convex near the apex; small species (6 ~ 10 mm.). 5, 6.
5. Elytra light-testaceous, each elytron with a transverse wavy fascia and with a small pointed humeral tooth. *unifasciatus*, sp. nov.
6. Wholly black or only apical part of elytra reddish, each elytron without or with a very small and obtuse humeral tooth. 7, 8.
7. Elytral intervals coarsely punctured; clypeus broadly truncate and feebly emarginate in front; pronotum with larger and stronger punctures.
..... 9, 10.
8. Elytral intervals finely punctured; clypeus nearly semicircular and scarcely emarginate in front; pronotum finely punctured, with larger punctures on the sides and along the base. 13, 14.
9. Elytral intervals convex, the punctures on which nearly as large as the larger punctures on the pronotum; elytra minutely but distinctly pubescent towards the apex, without humeral teeth; pronotum with rather large punctures closely set, the punctuation becomes somewhat larger towards the base, the sides scarcely rounded and sparingly punctured in the middle, the base emarginate on both sides; metatarsus a little shorter than the upper terminal spur of hind tibia and somewhat longer than the 3 following joints together; mesosternum somewhat closely punctured, and chagreened on the sides. 6.5—7.5 mm. Japan (plain) *atratus* Waterh.
10. Elytral intervals very slightly convex, bearing punctures nearly as large as the finer punctures on the pronotum; elytra very minutely perceptibly pubescent on the sides and towards the apex, each with a very small humeral tooth 11, 12.
11. Scutellum distinctly and coarsely punctured near the base; metatarsus nearly as long as the upper terminal spur of the hind tibia and shorter than the 4 following joints combined. 6.5—8.5 mm. Japan
..... *superatratus*, sp. nov.
12. Scutellum finely punctured near the base; metatarsus distinctly longer than the upper terminal spur of the hind tibia and nearly as long as the 4 following joints together. 6—7 mm. China (Szetschwan) *haliki* Balthasar
13. Elytral intervals distinctly convex, very finely and sparsely punctured; elytra reddish brown towards the apex; cheeks rather small and rounded.

- China (Szetschwan) *cobenbergeri* Balthasar
- 14. Elytral intervals flattened or very slightly convex, very finely punctured; elytra wholly black 15. 16.
- 15. Elytra intervals flattened, finely punctured; elytra very minutely and scarcely perceptibly pubescent on the sides and towards the apex, each elytron with a very small humeral tooth; pronotum somewhat rounded at the sides, sparsely punctured in the middle and without a longitudinal groove behind; mesosternum somewhat closely and strongly punctured, without a longitudinal groove in the middle. 6.5 mm. Formosa (high mountain) *formosanus*, sp. nov.
- 16. Elytral intervals vary slightly convex, very finely punctured; elytra without humeral teeth and entirely glabrous, pronotum rounded at the sides, sparingly punctured in the middle and without or with a very shallow longitudinal furrow behind; mesosternum very closely and strongly punctured, with or without a shallow longitudinal groove in the middle. 6.5 mm. Japan (high mountain) *japonicus*, sp. nov.

Aphodius (*Trichaphodius*) *pilosus* Harold

Aphodius pilosus, Harold, Berl. Ent. Zeitschr., xviii, p. 183 & 190 (1874).

Aphodius (*Trichaphodius*) *pilosus*, Ad. Schmidt, Arch. f. Naturg., 79 A, fasc. 11, p. 136 (1913); Ad. Schmidt, Das Tierreich, 45, p. 138 (1922).

Oblong, a little shining, wholly pubescent above, dark brown, with the sides of head paler in colour.

Head rounded and truncate in front, strongly and somewhat coarsely punctured, the frontal suture slight, and the cheeks rounded. Sides of pronotum are margined and scarcely rounded, the hind angles emarginate, the base distinctly emarginate on both sides, and the upper surface strongly and somewhat coarsely punctured. Scutellum triangular, punctured and pubescent. Elytra finely and somewhat deeply striate, with distinct punctures in the striae, the intervals a little convex, strongly and closely punctured, the pubescence on the dorsum as long as those on the sides. Metasternum sparsely punctured and pubescent, with a shallow longitudinal line in the middle, somewhat closely punctured and pubescent on the sides. Femora and abdomen also punctured and pubescent. Metatarsus a little longer than the upper terminal spur of the hind tibia and also the 3 following joints together.

♂. Fore tibiae bent down obliquely inwards in the apical half and truncate at the apex, with a terminal spur dilated towards the apex and truncate. Fore femur bears a sharp but small tooth on the anterior ridge. Lower terminal spur of the middle tibia very short and truncate at the tip.

♀. Fore tibiae scarcely curved inwards in the apical half and not truncate at the apex, with a terminal spur pointed. Fore femur without or with the trace of a tooth, the lower terminal spur of the middle tibiae long.

Body length: 6.5–7.5 mm.

Habitat: Hindostan, Formosa.

Aphodius (Trichaphodius) eccoptus Bates

Aphodius (Melinopterus) eccoptus, Bates, Ent. Monthly Mag., xxv, p. 297 (1839).

Aphodius (Melinopterus) eccoptus, Ad. Schmidt, Genera Insect., 110, p. 60 (1910).

Oblong, somewhat shining, dark or reddish brown, with the head in front and the sides of pronotum paler in colour, and pubescent on the sides of pronotum and on the elytra.

Head rounded, scarcely truncate in front, finely and distinctly punctured, the frontal suture distinct, narrowly impressed, and the cheeks a little angulate. Sides of pronotum margined and moderately rounded, the hind angles emarginate, the base slightly emarginate on both sides, and the upper surface finely but distinctly punctured. Scutellum triangular, punctured and pubescent. Elytra finely striate, the punctures in the striae distinct, the intervals a little convex, finely and sparsely punctured, the pubescence on the dorsum shorter than those on the sides and inconspicuous. Metasternum sparsely punctured and shortly pubescent, with a narrow but distinct longitudinal line in the middle, punctured and pubescent on the sides. Each abdominal segment also punctured and pubescent, with a transverse row of long hairs. Femora sparsely punctured and pubescent. Metatarsus nearly as long as the upper terminal spur of the hind tibia and also the 3 following joints together.

♂. Fore tibiae curved downwards in the apical half and a little inwards in the apical one third, truncate at the apex, with the terminal spur dilated towards the apex and truncate. Fore femur with a small tooth on the anterior ridge, the lower terminal spur of the middle tibia vary short, slender and obtuse at the tip.

♀. Fore tibiae scarcely curved inwards and not truncate at the tip with a terminal spur pointed. Fore femur without a small tooth, the lower terminal spur of the middle tibia rather long.

Body length: 7.7–9.0 mm.

Habitat: Japan (Honshu).

Aphodius (Pharaphodius) chokaiensis, sp. nov.

Oblong, moderately convex and shining, pale brown, with the vertex, disk of pronotum and the suture of elytra fuscous.

Head rounded, truncate in front, very finely and not closely punctured, the frontal suture invisible and the cheeks angulate. Pronotum transverse, the sides and the hind angles finely margined, the base not margined in the middle, the upper surface finely, on both sides of the disk somewhat coarsely and closely, punctured, the sides nearly straight and very feebly sinuate behind the middle, and rounded in front, the hind angles truncate and slightly emarginate. Scutellum narrow triangular and smooth. Elytra slightly dilated in the middle, finely striate, with fine punctures in the striae, the intervals slightly convex, with scattered fine punctures, and on the apical part of elytra finely pubescent. Metasternum finely punctured,

rather shallowly impressed in the middle, with a narrow median line, on the sides finely chagreened and pubescent. Hind tibiae bear setae of different length at the apex. Metatarsus longer than the upper terminal spur of the hind tibia and also the 3 following joints combined.

Body length: 4.5–5 mm.

Habitat: Japan (Honshu).

Holotype (1 ♂): Mt. Chokai, Uzen, Honshu: 28. June 1936 (K. Shirahata leg.).

Type in our collection.

This species resembles *A. (Pharaphodius) subcostatus* Kolbe closely, but the head is not emarginate in front, the posterior half of the side of pronotum is nearly straight and feebly sinuate in both sexes, and in the male the fore tibiae are normal.

Aphodius (Agrilinus) hasegawai, sp. nov.

Oblong-oval, convex, a little shining, black, with the front margin of head, front angles of pronotum and the shoulders or the base of elytra reddish, sometimes the elytra partly or wholly reddish brown.

Head strongly punctured in front and the punctures somewhat larger behind, with a obsolete short transverse carina before the middle, three small tubercles on the frontal suture well developed in the male (especially the median one), and obsolete in the female, the clypeus emarginate in front, obtusely angulate and scarcely rounded on both sides, and the cheeks small and a little prominent. Pronotum rather closely and strongly, on the sides very closely, punctured, with fine punctures between larger ones, the hind angles obtuse and rounded, the base margined, and the sides nearly straight behind, and rounded and narrowed in front. Scutellum triangular, finely chagreened, with a few shallow punctures near the base. Each elytron bears a minute humeral tooth, distinctly striate, the punctures in the striae fine and somewhat stronger towards the base, the intervals finely chagreened and finely punctured, longitudinally elevated in the middle and flattened on the sides of each one (i. e. the peripheries of each stria), and the extreme margins along the striae are very narrowly ridged in the male, and the elevated parts become broader towards the base. Metasternum strongly and on the sides sparsely punctured, with a median longitudinal line, and chagreened near the side margins. Abdomen finely chagreened. Femora strongly punctured, the terminal setae of the hind tibiae rather short and nearly equal in length, the upper terminal spur shorter than the metatarsus, and the latter a little shorter than the 3 following joints together.

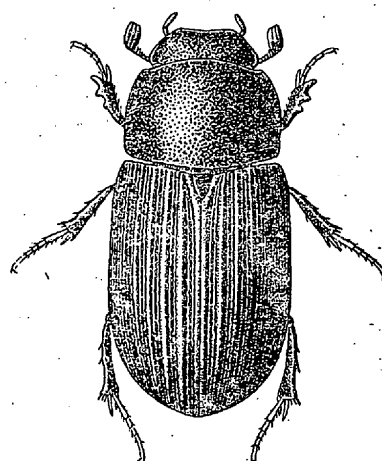


Fig. 2 *Aphodius (Agrilinus) hasegawai* Nomura et Nakane

Body length: 4 mm.

Habitat: Japan (Honshu).

Holotype (1 ♂): Noziri, Shinano, Honshu: 30. April 1942 (T. Nakane leg.). *Allotype* (1 ♀) & 1 *paratype* (1 ♂): Kamikochi, Shinano, Honshu: 21.—28. July 1947 (S. Osawa leg.). 1 *paratype* (1 ♂): Odayama, Aizu, Honshu: 21. May 1946 (Y. Kurosawa leg.). Types in our collection.

This species seemed to be closely allied to *A. (Agrilinus) surdus* Boucomont, but less opaque, with a transverse carina before the middle of the head, and the sutural margins are not subtectiform.

Aphodius (Agrilinus) maritimus, sp. nov.

Oblong, moderately convex and shining above. Head and thorax black, with the margin of head, sides of pronotum, as well as scutellum and elytra, blackish brown. The apex of elytra opaque.

Head rather closely punctured and somewhat rugose in front, the frontal suture trituberculate, the lateral tubercles transverse, without an impression behind the median tubercle, the clypeus scarcely emarginate in front and rounded on both sides, the side margins, in a straight line, convergent forwards, and the cheeks prominent and rounded. Pronotum bears large and small punctures quite unevenly and somewhat closely set, and the punctuation not sparse even in the middle, the hind angles rounded, and the side margins and base finely margined. Scutellum somewhat narrowly triangular, and feebly and minutely chagreened, with a few scattered fine punctures near the base. Elytra rather finely striate, with distinct punctures in the striae, the intervals nearly flat and very finely punctured. Metasternum finely punctured, with a median longitudinal line in the middle, and rather coarsely punctured and pubescent on the sides. Metatarsus longer than the upper terminal spur of the hind tibia and nearly as long as the 2 following joints together.

Body length: 4 mm.

Habitat: Japan (Honshu).

Types (4 ♂♂): Shionomisaki, Kii, Honshu: 12. April 1941 (T. Nakane leg.). Types in our collection.

This species is allied closely to *A. (Agrilinus) uniformis* Waterhouse.

Aphodius (Agrilinus) hayachinensis, sp. nov.

Body above shining, the apex of elytra opaque. Head, pronotum and also scutellum black, the elytra blackish brown, and the sides of pronotum, shoulders and the apex of elytra somewhat reddish.

Head strongly, somewhat closely punctured, without tubercles, only with a sutural line, which is feebly elevated in the middle and on both sides, the clypeus feebly emarginate and rounded on both sides, the side margins rounded and narrowed forwards, and the cheeks rounded, projecting a little beyond the eyes. Pronotum finely and coarsely, in the middle a little sparsely, and on the sides closely punctured.

ed, the hind angles obtuse and the base margined. Scutellum a little narrowly triangular, finely punctured. Elytra distinctly striate, with punctures in the striae, the intervals slightly convex and finely punctured. Metasternum smooth, and punctured on the sides, metatarsus as long as the upper terminal spur of the hind tibia and a little longer than the 2 following joints combined.

Habitat: Japan (Honshu).

Locality: 1 ♀; Mt. Hayachine, Rikuchu, Honshu: 26. July 1937 (S. Nomura leg.).

This species somewhat resembles *A. (Agrilinus) striatus* Ad. Schmidt.

Aphodius (Agrilinus) pratensis, sp. nov.

Oblong and a little dilated posteriorly. Black, shining, with the margin of head, the sides of pronotum and the apex of elytra more or less reddish, sometimes shoulders, suture and the apex of elytra, or the elytra wholly reddish.

Head somewhat strongly punctured, with a fine but well defined sutural line of the frons, which is slightly elevated in the middle and on the sides, the clypeus feebly emarginate in front, rounded on both sides, gently convex in the middle, and the side margins, in a straight line, convergent forwards, and the cheeks rounded and a little projecting beyond the eyes. Pronotum bears somewhat larger and smaller punctures, which are set closely on the sides and not so closely in the middle, the hind angles obtuse, the sides and the base narrowly but distinctly margined. Scutellum triangular, minutely chagreened and finely punctured. Elytra distinctly striate, with rather strong punctures in the striae, the intervals flattened, finely and sparingly punctured. Mesosternum longitudinally strigose in the middle, chagreened and somewhat coarsely punctured on the sides. Metasternum finely punctured, with a longitudinal line in the middle, and the sides punctured and pubescent. Abdomen punctured and pubescent, and finely chagreened. Femora finely and sparsely punctured. Metatarsus longer than the upper terminal spur of the hind tibia and also the 2 following joints together.

Body length: 4-5 mm.

Habitat: Japan (Honshu).

Holotype: (1 ♂) & 1 *paratype* (1 ♀): Kozu Pasture, Kozuke, Honshu: 17. Oct. 1942 (Y. Yamamoto leg.). *Allotype* (1 ♀) & 2 *paratypes* (1 ♂, 1 ♀): Kirikome, Oku-Nikko, Shimotsuke, Honshu: 21. July 1930 (S. Asahina leg.), 3 *paratypes* (2 ♂♂, 1 ♀): Kotoku-numa, Oku-Nikko, Shimotsuke, Honshu: 27. July 1930 (S. Asahina leg.). Types in our collection.

This species is somewhat allied to *A. (Agrilinus) putridus* (Herbst) and *A. (A.) pecirkai* Balthasar, but may be distinguished from the second by the length of the metatarsus, which is in *putridus* as long as the upper terminal spur and the 3 following joints, and in *pratensis* longer than the upper terminal spur and the 2 following joints, and from the third may be separated by the different coloration.

Key to the species of *Agrilinus* from Japan

1. Clypeus with an arched transverse carina 3, 4.
2. Clypeus without a transverse carina 7, 8.
3. Upper surface rather opaque; intervals of elytra longitudinally convex in the middle and the sides of which flattened *hasegawai*, sp. nov.
4. Upper surface shining; intervals of elytra nearly flattened 5, 6.
5. Apex of elytra scarcely less shining than the dorsum; clypeus not roughly sculptured; pronotum very unevenly punctured; sutural striae of elytra deeply impressed in the whole length *nigerrimus* Waterhouse
6. Apex of elytra opaque; front angle of pronotum obscurely reddish, unevenly, finely but strongly punctured; 1st striae of elytra much deeply impressed in the inclined apical part *etorofuensis* Kono
7. Elytra opaque at the apex; head with tubercles; elytra wholly blackish or reddish brown 9, 10.
8. Elytra evenly shining; head without tubercles; elytra black or with reddish markings 11, 12.
9. Head finely and in front somewhat rugosely punctured, slightly impressed behind the median tubercle; pronotum very unevenly and less closely, in the middle sparingly punctured; metatarsus longer than the upper terminal spur and the 2 following joints combined *uniformis* Waterhouse
10. Head less closely and in front somewhat coarsely and rugosely punctured, without impression behind the median tubercle; pronotum very unevenly and rather closely, in the middle not sparingly punctured; metatarsus longer than the upper terminal spur and as long as the 2 following joints together *maritimus*, sp. nov.
11. Elytra gently convex, blackish brown, with shoulders and apex reddish; intervals less convex; the sides of pronotum rounded; metatarsus as long as the upper terminal spur and a little longer than the 2 following joints together *kayachinensis*, sp. nov.
12. Elytra less convex and somewhat more convex backwards, black, obscurely reddish before the apex (sometimes the elytra brownish and the shoulders, suture and the apex reddish or the elytra wholly reddish); intervals nearly flat; the sides of pronotum nearly straight and very slightly sinuate before the hind angles; metatarsus longer than the upper terminal spur, and the 2 following joints combined *pratensis*, sp. nov.

Aphodius (*Tristaphodius*?) *gotoi*, sp. nov.

Oblong, moderately convex and a little shining above, castaneous, with the vertex, disk of pronotum and indistinct oblong marking in the middle of each elytron fuscous.

Head rather closely and finely punctured, slightly impressed and emarginate in front, with a tubercle behind the middle and somewhat elevated in front of it, and the cheeks rather small, a little prominent and obtusely rounded. Pronotum thickly

and distinctly punctured and minutely pubescent on the whole surface, narrowed forwards in the anterior half, the sides and the base very narrowly margined, the hind angles obtuse and rounded. Scutellum narrowly triangular and minutely chagreened. Elytra finely and shallowly striate, the intervals nearly flat, very minutely chagreened, finely and closely asperate-punctate and minutely and closely pubescent. Metasternum smooth and shining, sparsely punctured and shallowly impressed in the middle, with a median longitudinal line. Hind tibiae bear short setae of different length. Metatarsus a little longer than the upper terminal spur of the hind tibia and nearly as long as the 2 following joints together.

Body length: 5 mm.

Habitat: Japan (Honshu).

Holotype (1 ex.): Mt. Nekodake (1500 m.), near Sugadaira, Shinano, Honshu: 24.-27. July 1943 (M. Goto leg.). Type in our collection.

This species is very peculiar and we can find no allied ones from Japan. According to the description it resembles somewhat *A. (Tristaphodius) mortuorum* Balthasar, but its head is rather shining and distinctly punctured, with a median tubercle behind the middle, and the base of pronotum is finely margined.

Rhyssemus tuberculatus, sp. nov.

Oblong, slightly dilated backwards, convex, black and opaque.

Head strongly and on the vertex much finely granulate, with obsolete oblique carinae on both sides, the clypeus in front reddish, emarginate in the middle and obtusely angulate on both sides. The front angles of pronotum a little produced and rounded, the hind ones emarginate, the sides and the base fringed with bat-shaped setae, the whole surface densely granulate and transversely grooved, the 1st, 2nd and 4th groove obsolete, the 3rd deep and distinct, so that the 1st, 2nd and the 3rd ridge, and the 4th and 5th united together respectively, the latter two interrupted in the middle by a short longitudinal groove. Scutellum small and triangular. Each elytron finely striate, with a small humeral tooth, the striae distinct and deep, nearly as wide as the intervals, the punctures in the striae deep, each costate interval bears a row of tubercles. Metasternum roughly sculptured on the sides, strongly punctured and longitudinally grooved in the middle. Each abdominal segment bears a zigzag transverse line along the middle. Femora somewhat closely and coarsely punctured. Metatarsus a little longer than the upper terminal spur of the hind tibia and nearly as long as the 3 following joints together.

Body length: 2.7-3 mm.

Habitat: Japan (Honshu).

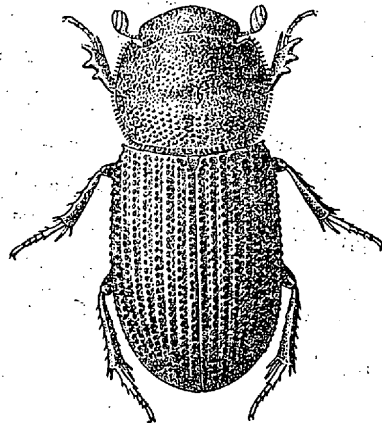


Fig. 3 *Rhyssemus tuberculatus*
Nomura et Nakane

Types: 1 ex. Tokyo, Musashi, Honshu: 27. May 1946 (T. Nakane leg.); 7 ex. Chiba, Shimofusa, Honshu: 2. May 1948 (S. Nomura leg.); 4 ex. Tokyo, Musashi, Honshu: 30. April 1948 (S. Nomura leg.); 2 ex. Tokyo, Musashi, Honshu: 9. May 1948 (S. Nomura leg.); 1 ex. Tokyo, Musashi, Honshu: 8. May 1941 (H. Watanabe leg.). (in our coll.)

2 ex. Tokyo, Musashi, Honshu: 17 & 20. June 1943 (H. Watanabe leg.). (in the collection of Tokyo Science Museum.)

According to the description this species somewhat resembles *R. granosus* Klug & Erichson, but may be distinguishable from the latter by the indistinct grooves (except the 3rd) of pronotum, and each interval of elytra with a row of tubercles.

MOZARTIUS, gen. nov.

Head nearly semicircular, emarginate in front, with a distinct frontal suture between the eyes, and in front of it with an arched carina. Side margins of pronotum crenulate and the crenulation becomes larger towards the base, the upper surface with a shallow and broad longitudinal furrow in the middle, behind the front margin with narrow impressions and in the middle of each side with an oblique shallow impression. Elytra gently dilated posteriorly, each elytron with a small humeral tooth, finely and feebly striate. Fore tibiae with 3 outer teeth, the middle and hind tibiae with distinct transverse carinae.

This genus is apparently related to *Caelius* Lewis in the crenulate side margins of pronotum, but the latter genus never belongs to Aphodiinae, but to Aegialiinae (cf. S. Nomura: Ueber die japanischen Aegialiinae, Mushi xv, 1943, p. 109-112). Therefore the genus *Mozartius* may take the place of *Caelius* in the subfamily Aphodiinae.

Mozartius testaceus, sp. nov.

Oblong-oval, reddish brown, shining.

Head semicircular, emarginate in front, strongly but somewhat finely and sparsely punctured, between the eyes somewhat sparingly punctured, with a distinct frontal suture and an arched carina immediately in front of it, the carina limited in the anterior part of the emarginate front margin of clypeus, and from here to the front margin almost vertically inclined, the basal half of vertex bears fine punctures and in the middle anteriorly somewhat produced forwards. Pronotum transverse, a little broader than the base of elytra, the front angles rounded and the hind ones indistinct, the side margins crenulate and the crenulation becomes larger towards the base, very small and indis-

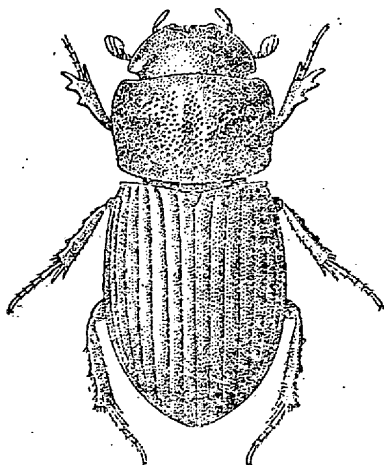


Fig. 4. *Mozartius testaceus* Nomura et Nakane

tinct on the front angles and on the base becomes obtuse and indistinct towards the middle, the upper surface sparsely, shallowly and coarsely punctured, anteriorly with fine punctures between the larger ones, in the middle with a shallow and broad longitudinal furrow, and behind the front margin with a narrow, in the middle of each side with an oblique shallow impression, and each impression somewhat closely punctured. Scutellum narrowly triangular and smooth. Elytra dilated posteriorly, each elytron with a very small and pointed humeral tooth, finely and shallowly striate, the punctures in the striae slightly notch the sides of the intervals, the latter a little convex, finely and sparingly punctured and flattened at the apex, the 3rd interval very convex at the base. Metasternum punctured and shallowly grooved in the middle, with a feeble longitudinal line, on the sides closely punctured. Abdomen punctured and pubescent. Fore tibiae not strongly dilated, with a pointed terminal spur and 3 outer teeth, the middle and hind tibiae bear distinct transverse carinae. Metatarsus as long as the upper terminal spur of the hind tibia and also the 3 following joints together.

Body length: 4.5 mm.

Habitat: Japan (Honshu).

Localities: Asagaya, Tokyo, Musashi, Honshu: (C. Nagaoka leg.); Katase, Sagami, Honshu: 5. Nov. 1934 (A. Yoshida leg.).

耐凍性昆蟲の凍り方

朝比奈英三・青木 廉*

Some notes on the freezing process of frost-hardy insects

Eizo ASAHINA and Kiyoshi AOKI

I) 多くの昆蟲はその外圍の溫度が低下しても體内に凍結が始まらない限り致命的な害を受ける場合は比較的少なく、又冷却速度が小さいと過冷却状態になりやすいものである。自然状態における昆蟲の耐凍性の説明は従来しばしば唱えられて來た結合水説などでは非常に無理があり、むしろ少くとも一部の昆蟲では體内の水が單に過冷却状態になつて凍りにくいと考えた方が無理が少ないことをつて指摘したが¹⁾、こゝでは實際に昆蟲の體内に氷が出來た場合を考えてみよう。

Bachmetjew の唱えた有名な「凍結は蟲が凍つてから更にその過冷却點の溫度迄再び冷されたときに致命的となる」という説²⁾が多くの人々によつて批判³⁾されてからは、割合に高い

* 北海道大學，低温科學研究所